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Progress in Amenities Examined

When one buys a car, a vacuum cleaner, or a washing machine, it is wise to ascertain the mechanical efficiency first and then to regard the æsthetic aspect later. Otherwise, presentation—by which we mean a combination of colour and shape—may lead one into acquiring a totally inefficient article. These thoughts were uppermost in our minds after visiting one of the country's most modern foundries. This concern possesses a well-merited reputation for the supply of high-grade grey-iron castings and is also noteworthy for having done everything possible to implement the Garrett Report. It has inaugurated an excellent system for the training of its apprentices; it has organised joint works committees; a works magazine is published; the canteen and sports facilities are excellent; washing and bathing accommodation is in advance of requirements; first aid and aids to rehabilitation are of the highest order; industrial vacuum cleaning plant is in operation, and the shops have been colour-painted. Thus an excellent opportunity was afforded to us to pass on to foundries contemplating the extensions to the amenities they accord their workpeople, the order of priorities for such enterprises. We deem it desirable, first of all, to have a good shop in which to work. Thus ventilation, cleanliness, dust extraction at source, and lighting must take preference. Now the foundry we visited had envisaged and carried out all these activities, plus colour-painting. Having seen the results, we felt (1), prior to undertaking painting, any brick walls should be plastered. Painting has emphasised this lack, as it shows up the dust deposits in greater relief. Smooth surfaces are more to be desired than colour; that is why we opened by making references to cars, vacuum cleaners and washing machines. Painting has also shown up to disadvantage the seemingly enormous quantity of piping and wiring on the walls of the average foundry. A serious effort should be made to put as much as possible into underground, yet easily inspected, ducts. The modern housewife is a near-vandal in her efforts to rid her rooms of dust traps—even if they be of distinct artistic merit. So, too, it must be with foundries, and "dust traps" should, as far as possible, be avoided.

That brings us to vacuum cleaners. Unless steps be taken to avoid the maximum number of dust traps as possible, vacuum cleaners are about as much use as would be an artist's camel-hair brush for cleaning out the Augean stables. At the moment, their utility is for the periodic cleaning of overhead cranes, roof trusses and, generally, those places where any system other than aspiration means dispersion to atmosphere. For easily get-at-able locations, a brush and a sprinkling of water will be just as effective and cheaper. Thus we feel that the first step is—to use hackneyed phraseology—to get the shop "streamlined"; then and then only should colour-painting be undertaken. We never did like "dirty finery," and this can easily result unless all dust traps be removed.

Thus, it will be seen, we first plump for a good shop in which to work. The provision of canteens is statutory, so next on the list is washing, bathing and changing facilities. The basic needs in this direction are not strictly related to the foundry, but to its size and the locality in which it is situated. We have previously dealt with this subject and, after having acquired information as to their popularity, our advice is to start on a small scale with provision for expansion. It has been found that only a small percentage of the employees—a percentage

(*Continued on page* 218.)

Contents

Progress in Amenities Examined, 217.—The Institute of Vitreous Enamellers—Spring Meeting, 218.—British Standards Institution, 218.—Forthcoming Events, 218.—Pioneer Swedish Centrifugal Pipe Foundry, 219.—37th Paris Trade Fair, 221.—Institute of Metals Annual Meeting in London, 221.—Acicular Cast Iron, 222.—The Development of Foundry Sand Control, 223.—Latest Statistics, 229.—Institute of Metals Medal, 229.—The Industrial Organisation and Development Act, 1947, 230.—Spring Refresher Course, 230.—High Wages Sought, 230.—Steel Scrap for Germany, 231.—A.E.C. Bid for Crossley Motors' Shares, 232.—Follsain Metals' Shares, 232.—Price-fixing Policy, 233.—Awards for Metallurgical Papers, 233.—Institute of Metals' Medal for Mr. R. C. Stanley, 233.

Progress in Amenities Examined

(*Continued from previous page.*)

happily rising—use the existing facilities. Returning ex-Servicemen are the most appreciative and elderly employees the least. The first-aid department at the works we visited was, as we have found in other cases, staffed not merely by an efficient personnel, but an enthusiastic one. Here the nurse in charge was dead keen on having sun-ray treatment and other apparatus available for rehabilitation cases, and the directive were sanctioning its provision. It is a departure which we, in common with the rest of the industry, will follow with real interest. Finally, in thanking our recent hosts, we hope they will excuse the publication of our findings and our mild criticisms of the magnificent endeavours they have made to eclipse the provisions of the Garrett Report.

The Institute of Vitreous Enamellers

Spring Meeting

The Council have arranged for the Spring Meeting to take place at Bournemouth from May 26 to 29, the full programme for which is in course of preparation. Two very interesting Papers are being prepared, one by Mr. H. Silman on "Modern Methods of Metal Preparation for Subsequent Vitreous Enamelling" and Dr. T. P. Hoar on "The Enamel—Iron Interface."

These Papers will be delivered on the mornings of May 27 and 28. Two works visits have been arranged for the afternoons, as follow:—Folland Aircraft, Limited, and C.O.A. Products, both of Southampton. Folland Aircraft manufacture high-grade refrigerators and C.O.A. Products specialise in the mass production of pressed-steel vitreous-enamelled baths. (For the ladies, it has been suggested that a drive through the New Forest would be appreciated.)

The headquarters of the meeting will be at the Grand Hotel, and arrangements have been made for a block booking at that hotel, the accommodation to be allotted to those who first apply to the manager, mentioning the I.V.E. In view of the difficulty in obtaining accommodation in Bournemouth during the summer season, members are strongly advised to make their reservations at the earliest possible date. Further details may be obtained from Mr. W. Thomas, hon. general secreworth, Ebury Chambers, 74, High Street, Rickmansworth, Herts.

British Standards Institution

The "Monthly Information Sheet" for December, 1947, recently received, lists under:—

New Standards Issued

1421:1947, Picks, beater picks and mattocks, 2s.

1430:1947 Aluminium rainwater goods (cast and extruded), 2s. 6d.

Amongst "New Work Started" there are electric fires; electric cookers; thermostats for electric cookers; cast-iron imbedded and sheathed-wire boiling plates, and film storage cabinets.

Forthcoming Events

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

MARCH 8.

Institute of British Foundrymen.

Sheffield Branch:—"A Modern Method of Foundry Planning," by D. A. Chaytor, at the Royal Victoria Hotel, Sheffield, at 7.30 p.m.

Institution of Production Engineers.

Manchester Graduate Section:—"Heat-treatment," by H. G. Baron, at the College of Technology, Sackville Street, Manchester, at 7.15 p.m.

MARCH 9.

Institute of British Foundrymen.

Burnley Section:—Annual General Meeting, and short Paper, "Foundry Costing," by Mr. Greenwood, at the Burnley Municipal College, Ormerod Road, Burnley, at 7.30 p.m.

The Institute of Metals.

Swansea Section:—"Continuous Casting," lecture at the Y.M.C.A., Swansea, at 6.30 p.m.

Institution of Production Engineers.

London Graduate Section:—"Die-castings," lecture at the Waldorf Hotel, Aldwych, London, W.C.2, at 7 p.m.

MARCH 10.

Institute of British Foundrymen.

Lancashire Branch:—"Foundry Practice in a Large Works Manufacturing Marine Propellers," by F. J. Tector, B.Eng., and J. Martland, at the Engineers' Club, Albert Square, Manchester, at 7 p.m.

East Anglian Section:—"Some Interesting Developments in Foundry Production," by A. J. Richman, at the Central Library, Ipswich, at 7.30 p.m

Institute of Welding

North London Branch:—"Bronze Welding of Cast Iron," by E. Ryalls, at the Technical College, Acton, London, W.3, at 7.30 p.m.

Institute of Vitreous Enamellers.

Southern Section:—"Gas Consumer Demands of the Enameller," by E. W. B. Dunning, B.Sc., A.R.I.C., at 7 p.m., at the Charing Cross Hotel, London, W.C.2.

MARCH 12.

Institute of British Foundrymen.

Middlesbrough Branch:—"Cupola Operation. Precept and Practice," by C. A. Payne, at the Cleveland Scientific and Technical Institute, Corporation Road, Middlesbrough, at 7 p.m.

Manchester Association of Engineers.

Annual Dinner and Dance, at the Grand Hotel, Aytoun Street, Manchester, at 7 for 7.30 p.m.

MARCH 13.

Institute of British Foundrymen.

Newcastle Branch:—Visit to the Wallsend Works of the North Eastern Marine Engineering Company, Limited.

Scottish Branch:—"The Influence of Production Flow on Moulding Methods in Iron Foundries and its Effect on P.M.H. and General Efficiency," by R. C. Shepherd. Preceded by Annual Business Meeting at the Royal Technical College, Glasgow, at 2.45 p.m. Annual Dinner at the Grosvenor at 6 p.m.

Institution of Production Engineers.

Yorkshire Graduate Section:—Annual Luncheon, followed by Annual General Meeting, at 2.30 p.m., and "Principles and Practice of Metallurgical Testing and Research," by J. W. Poole, at the Great Northern Hotel, Leeds.

BECAUSE OF THE growing pressure of his duties as secretary of the Institute of British Foundrymen, Mr. T. Makemson, M.B.E., has informed the Council of the Manchester Association of Engineers that he desires to relinquish his appointment as secretary of the latter organisation.

THE SECOND Posen International Trade Fair will be held in Poznañ, Poland, from April 24 to May 9. Details are available from the Town Hall of that city.

Pioneer Swedish Centrifucal Pipe Foundry

The "AB Centrifugalrör" Foundry at Oxelösund

Cast iron pipe was before the war a Swedish import item of considerable importance. The total annual Swedish needs of about 40,000 tons was obtained from abroad, chiefly from Continental factories. Shut off by the war from the normal sources of supply, a critical shortage of cast iron pipe developed in Sweden, and this acute situation naturally inspired plans for making the country self-sufficient in respect of this vital civic need of water supply authorities.

Of the many projects envisaged during this period of acute pipe shortage only one has materialised. This is the pipe foundry AB Centrifugalrör at Oxelösund, which now, after two years of construction, has started production of a wide range of cast-iron pipe.

The "ABC" pipe foundry is strategically situated at the ice-free port of Oxelösund on the Baltic coast of Sweden, some 90 miles south of Stockholm. Here

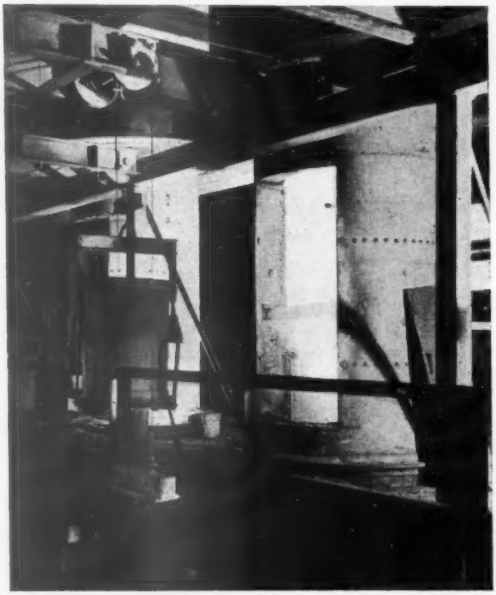


FIG. 1.—BUCKET CHARGING THE 10-TON PER HOUR CUPOLAS.

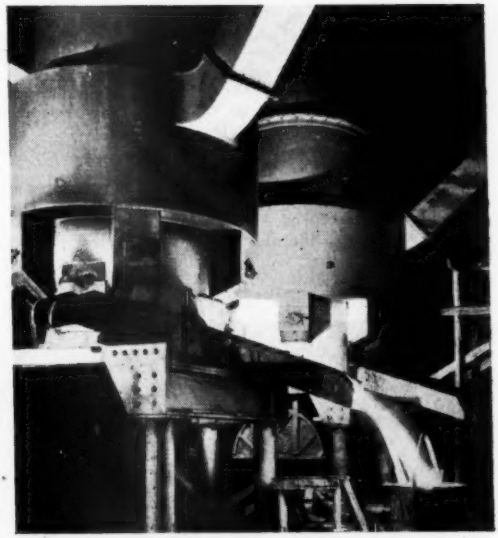


FIG. 2.—TAPPING METAL FROM CUPOLA TO TRANSFER LADLE.

is located its chief supplier of pig iron, the Oxelösund Ironworks and its subsidiary industries. This plant, with an annual capacity of about 100,000 tons of pig iron, was established in 1913 and has ever since been noted for its ability to produce pig-iron at prices comparable to those achieved by its Continental competitors. Its efficient production of pig iron is due, on the one hand, to its direct access, by rail, to the large Grängesberg iron-ore ranges in central Sweden and, on the other hand, to its favourable site in the harbour of Oxelösund which permits large coal carriers to discharge their cargoes directly into the coking plant of the iron works.

The new centrifugal pipe foundry recently purchased by the Swedish Co-operative Union, and HSB, the Co-operative Housing Organisation, and Riksbyggen, a Government subsidised housing corporation, is situated along the main ore railway to the ironworks, about 500 yds. from the smelters. Its supply of pig-iron, a medium phosphorous foundry iron excellently suited

Swedish Centrifugal Pipe Foundry

for pipe production, is delivered from the ironworks at a railway siding of the foundry.

The " ABC " pipe works operates according to the Arens method and is laid out for an initial capacity of about 30,000 tons a year. The four cupolas, each with a maximum capacity of about 10 tons per hour, are bucket charged directly from the siding. The cupolas alternate, two for each day's run, while the idle ones are being patched up.

The liquid metal is poured into transfer ladles and transported to two batteries of centrifugal casting machines, consisting of three 5-meter machines capable of producing 5-m. (about 17-ft.) pipe varying in diameter from 200 to 450 mm. (8 to 18 in.), and two 4-metre machines for somewhat smaller pipe diameters. The second battery consists of five machines for 2-m. drain pipe of 2½ in., 3 in. and 4 in. diameter.

After being stripped and weighed, the pipe passes through the continuous, oil-fired, automatically controlled annealing furnace. The pipe travels by finger conveyor and the thermostatically controlled furnace operates at 950 deg. C. Emerging from the cooling zone of the normalising furnace, the pipe rolls on a

FIG. 3.—POURING INTO THE WATER-COOLED MOULD FROM TELPHER-CONTROLLED TRANSFER LADLE.

FIG. 4.—LOADING PIPES INTO THE CONTINUOUS, OIL-FIRED, ANNEALING FURNACE.

FIG. 5.—DRESSING THE BORE OF THE PIPE AFTER ANNEALING.

three-rail cooling track to the fettling and grinding stations. It is then heated for efficient tar coating.

Swedish standards permit hydrostatic testing subsequent to the tar dip and the pipe is accordingly conveyed to the testing sheds where each one is head-clamped and subjected to a water pressure of 20 kg./cm.² (about 280 lb. per sq. in.) and a simultaneous impact test by hammer.

From the testing sheds the pipe rolls on an inclined six-rail track towards the railway siding. The storage area is equipped with two lateral distribution tracks to facilitate make-up of deliveries. The entire plant is Swedish built according to license agreement with the Swiss firm of Ludwig Rollsche Eisenwerke AG.

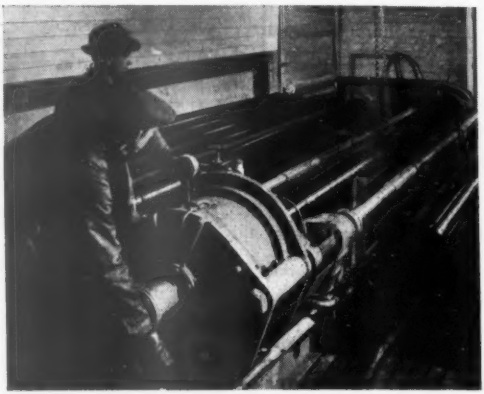


FIG. 6.—HYDRAULIC PRESSURE TESTING OF THE FINISHED PIPE.

Thirty-Seventh Paris Trade Fair

The *Foire de Paris*, Paris Trade Fair, will be held this year from May 1 to 17. British visitors possessing a "*Carte de Légitimation*," to be obtained from the London office of the *Foire de Paris*, 14-15, Rugby Chambers, 2, Rugby Street, London, W.C.1, at a cost of 2s. 6d., will have permanent access during the whole fair. Accommodation for visitors to the *Foire de Paris* from Great Britain can be reserved either through the "*Service du Logement*" (Hotel Service) of the Fair, or through the H.A.V.A.S. Travel Service Agency in London, at 154, Strand, W.C.2. In the former case, the necessary reservation form is obtainable from the London representative of the *Foire de Paris*, Miss E. Lambert, 2, Rugby Street, W.C.1.

(*Continued from column 2.*)

Cross, and (7) J. Stone & Company, Limited, Charlton. Ladies are invited to visit the Hall of the Worshipful Company of Goldsmiths (display of the company's plate and other exhibits; tea will be served).

The Institute of Metals

Annual Meeting in London

The annual general meeting will be held at the Institution of Civil Engineers, Great George Street, London, S.W.1, on March 16, 17 and 18. The following programme has been arranged.

Tuesday, March 16

2.30 p.m.—General meeting at the Institution of Civil Engineers, Great George Street, London, S.W.1.

Discussion of Papers by: Cook and Larke, "Calculation of Loads Involved in Metal Strip Rolling."

Jointly: Jennings, Singer and Pumphrey: "Hot-Shortness of Some High-Purity Alloys in the Systems Aluminium-Copper-Silicon and Aluminium-Magnesium-Silicon."

Jennings and Pumphrey: "A Consideration of the Constitution of Aluminium-Iron-Silicon Alloys and its Relation to Cracking Above the Solidus."

If time permits, discussion of:—McLean: "Striations: Metallographic Evidence of Slip."

Wednesday, March 17

10.0 a.m.—Presentation of the Reports of the Council and of the Honorary Treasurer; announcement of the election of officers for 1948-49; announcement of the award of the Institute of Metals (Platinum) Medal for 1948; induction of Sir Arthur Smout, J.P., as President; and Presidential Address, by Sir Arthur Smout, J.P.

1.0 p.m.—Buffet lunch (price 6s.) for ticket holders, at the Royal Institution of Chartered Surveyors, Great George Street, London, S.W.1.

2.30 p.m.—Discussion of Papers by:—Northcott, McLean and Lee: "The Effects of Single- and Multi-Hole Die Extrusion on the Properties of Extruded Aluminium Alloy Bar."

Dudzinski, Murray, Mott and Chalmers: "The Young's Modulus of Some Aluminium Alloys."

7.30 p.m.—Buffet dance, 4, Grosvenor Gardens, London, S.W.1 (tickets, 17s. 6d. each); dancing until midnight. Dress optional.

Thursday, March 18

10.0 a.m.—*Discussion of Papers by*:— Latin: "Pressure and Creep Tests at Constant Hoop Stress on Lead and Alloy 'E' Pipes"; and Brenner Roth: "Recent Developments in Corrosion-Resistant Aluminium-Magnesium Alloys."

Afternoon Visits

By kind invitation, members may visit one of the undermentioned works. As the parties are limited in numbers, it is requested that members shall indicate their order of preference.

Ticket holders only will be admitted to the works. An inclusive charge of 5s. per head is made to cover the cost of transport and administrative expenses. Coaches will leave from Great George Street. These visits are for members only. The works to be visited include:—(1) Aluminium Plant & Vessel Company, Limited, Wandsworth; (2) Enfield Rolling Mills, Limited; (3) Enfield Cables, Limited, Brimsdown; (4) High Duty Alloys, Limited, Slough; (5) Murex, Limited, Rainham, Essex; (6) Murex Welding Processes, Limited, Waltham

(*Continuer at foot of column 1.*)

Acicular Cast Iron

Mr. J. G. Pearce, as Reporter of the Fourth Report of the Research Committee on High-Duty Cast Irons for General Engineering Purposes, set up by the Institution of Mechanical Engineers, has summarised the findings in the following statement:—

Acicular cast irons show mechanical properties, and particularly toughness or shock-resistance, well in excess of the best high-duty cast iron hitherto known and hence offer considerable promise for high-duty engineering purposes.

In general, they can be produced in any type of melting unit, cupola, arc-furnace, induction furnace or crucible furnace, but where the amount required is sufficient the cupola is recommended, as, composition for composition, the cupola is quite adequate for grey irons of total carbon content not lower than 2.7 per cent.

The recommended composition for normal elements is as follows, although it will be understood that the acicular structure may be obtained with compositions outside this range, which covers engineering high-duty cast irons:—

Total carbon, 2.7 to 3.1 per cent.; silicon, 1.6 to 2.6 per cent.; manganese, 0.6 to 0.9 per cent.; sulphur, 0.15 per cent. max.; and phosphorus, 0.15 per cent. max.

It is necessary to inoculate the molten metal with a ladle graphitiser, and if ferro-silicon (75 per cent. silicon) or proprietary similar material be used, it should be added in quantity yielding an additional 0.3 per cent. to 0.6 per cent. silicon in the molten metal. The silicon in the charge materials will require to be reduced by like amount.

Composition According to Section Thickness

For alloying elements, the composition should be as follows:—

Molybdenum: 0.7 per cent. to 1.0 per cent. added as crushed or powdered ferro-molybdenum to the ladle during or immediately after pouring.

Nickel: 0.5 per cent. to 1.5 per cent. for section thickness up to 1.5 in.; 1.5 per cent. to 2.5 per cent. for between 1.5 in. and 3 in.; 2.5 per cent. to 3.0 per cent. for between 3 in. and 4 in.; 3.0 per cent. to 4.0 per cent. for between 4 in. and 8 in., and over 4.0 per cent. for thickness over 8 in. Nickel can be added to the cupola charge as F ingot, or as F shot in the ladle during or after tapping. Amounts below one per cent. can be added cold to the ladle, but above this they should be preheated.

Copper: Nickel in sections up to 1.5 in. may be replaced by its equivalent in copper, but the amount of copper should not exceed 1.5 per cent. In sections needing more than 1.5 per cent. nickel, the first 1.5 per cent. may be of copper and the balance nickel. Copper can be added to the cupola charge as massive copper scrap, or, otherwise to the ladle, preferably preheated.

Chromium: Below 0.3 per cent.

Vanadium: No addition should be made.

Alternatively, cupola charges should consist of steel scrap, hematite and/or refined iron, with such low-phosphorus return scrap as may be available. Silicon and manganese can be adjusted by massive lumps of ferro-silicon and ferro-manganese in the charge. In furnaces other than the cupola, the charge composition will be dictated by the required final composition.

Founding and Heat-treatment

The founding properties of acicular irons are similar to those of other irons of similar carbon and silicon content. The casting should not be stripped until it is cool, and never while it is above 300 deg. C., unless accelerated cooling in large castings is necessary to economise in alloy additions.

The casting should be treated at 300 deg. C. to 350 deg. C. for five hours plus one hour for each 1 in. of section size above 2 in., and cooled slowly. The heat-treament improves the machinability without affecting hardness appreciably and considerably improves the mechanical properties.

Acicular cast irons will give tensile strengths of 25 to 40 tons per sq. in. and transverse strengths of 40 to 70 tons per sq. in. The lower the total carbon, the higher the strength will be. For a given section and carbon content, the higher strengths are obtained with higher nickel contents, but this higher strength will be accompanied by increased hardness—both due to the formation of martensite. For maximum strength the nickel or copper should be as high as possible, for a maximum machinability the nickel or copper content should be as low as is consistent with obtaining the acicular structure. Acicular cast irons have excellent shock-resistance, two or three times that of a high-duty pearlitic iron. Measured on a cylindrical unnotched bar, strengths of 25 to 50 ft.-lb. may be expected, when tested on the standard Izod machine.

In considering the mechanical properties of acicular cast irons for engineering purposes, less emphasis should be laid upon the maximum tensile strengths obtainable than upon the fact that they offer a range of cast irons having mechanical properties in excess of those normally obtainable from the pearlitic irons. It is in many cases more important to ensure a tensile strength in the region of the highest limit indicated in British Standard Specification No. 786, than to aim at higher figures which may not be obtained with certainty.

Application

Acicular irons have proved of exceptional value during the war for shell-forging dies; stamping dies for light alloys and other non-ferrous metals and steels; cast camshafts and crankshafts for petrol and oil engines and compressors; and for lathe tool shanks and other machine tool components where high strength coupled with high shock-resistance and good damping properties are required. The thermal treatment, by relieving casting stresses, gives them excellent stability and freedom from distortion on machining.

Thus, shell dies for 25-pounder shells gave a life of 4 to 10 times that of good quality engineering iron, one example giving a throughput of 62,000 forgings compared with an average of 8,000 for grey-iron dies.

Acknowledgments.—The experimental work by the British Cast Iron Research Association, under the direction of the Reporter, has been carried out by Mr. H. Morrogh and Mr. J. W. Grant.

The Development of Foundry Sand Control*

By G. L. Harbach

(*Continued from page* 199.)

Disadvantages of Synthetic Sands—Cont.

From the foregoing it will be realised that the adoption of naturally-bonded sand, synthetic sand or a mixture of both, is dependent on so many factors that the choice must be left to individual decision according to the particular conditions. The following gives details of the stages of developments in the author's own sand practice in response to changing conditions.

First Selection of Iron Foundry Sand

Before selecting a new sand for the iron foundry mechanised section, consideration was given to the possibility of using a blended sand similar to that used in the brass foundry but, owing to the higher casting temperature and consequent greater clay loss, such a change was impracticable. The brass-foundry facing which had contained 9 per cent. Mansfield alone had become 30 per cent. of Mansfield and silica sand together (see Fig. 6), and, as this foundry was using 54 per cent. Mansfield in the iron-foundry green-sand facing mixture, the addition of sufficient silica sand to raise the permeability number to 30, plus the extra Mansfield to provide bond for the silica sand, would have increased the total additions to unwieldy proportions and would have resulted in a rapidly growing sand heap with a large and expensive discard.

It might have been thought advisable to use a proprietary clay to provide bond for the silica sand, and so start on a semi-synthetic basis. However, unless essential, it was preferred not to add the difficulty of a distinctly new type of moulding sand to the other development problems, particularly with the uncertainty of war-time supply and transport at that period.

With a bias in favour of a local red sand, plus the results of laboratory tests which showed it would give about 30 permeability, Bramcote sand was selected for the iron section. Although it was realised the green strength would be lower than when using Mansfield, experience in the brass foundry had shown the high figures previously obtained were not essential for the class of work being made, particularly as at that time all the moulds were being made on roll-over machines.

The green-sand facing had previously contained 54 per cent. Mansfield and this amount was replaced by Bramcote. The change raised the permeability from approximately 20 to around 30, and the green strength fell from 8 to 9 lbs. per sq. in. to 6 to 7 lbs. per sq. in., and sometimes lower. Occasional trucks were coarser than usual and, whilst these lasted, the permeability increased, but the casting finish deteriorated (see Fig. 7). Moreover, the amount of Bramcote required to restore the bond was more than sufficient to offset sand losses so that the heap grew to unwieldy size—calculations indicated that, if dumping of good sand was to be avoided, about 35 per cent. new sand was desirable instead of the 54 per cent. being added.

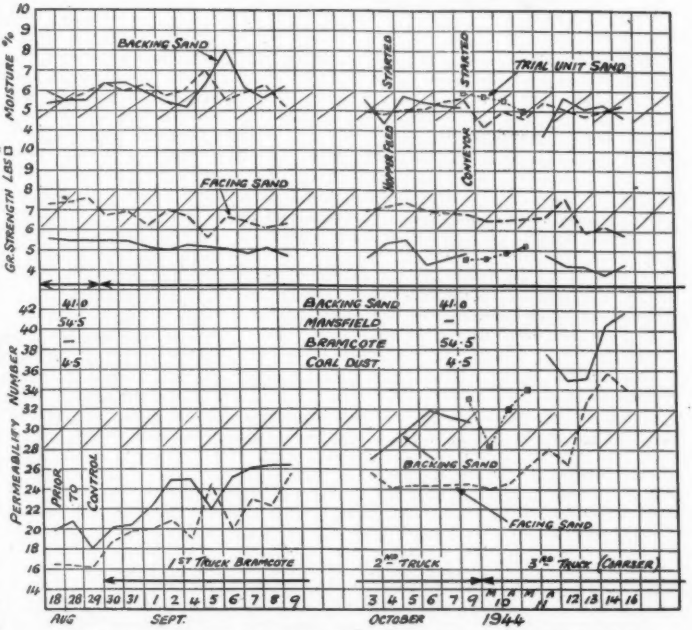


FIG. 7.—RESULTS OF DAILY TESTS ON BRAMCOTE SAND MIXTURE.

* A Paper read before the East Midlands Branch, the Lincoln Section, and the Wales and Monmouth Branch of the Institute of British Foundrymen.

D

Development of Foundry Sand Control

The mechanised section had by this time proved so successful that the size of casting was increasing; two pin-lift machines were installed to take boxes up to 8 in. deep and a 750-lb. roll-over machine, previously used for dry-sand work, was put on to making all green-sand castings up to 3 cwts.—all to be served from the same sand distribution system.

All these factors called for a sand with a higher green strength but without loss of permeability or surface finish, therefore, an investigation was carried out to find a suitable alternative to Bramcote. From published figures Worksop red sand appeared to have properties about midway between Mansfield and Bramcote, whilst a Yorkshire yellow sand, similar to Pickering Medium shown in Fig. 5. had the advantages of a clay content higher than Mansfield with practically no fines or

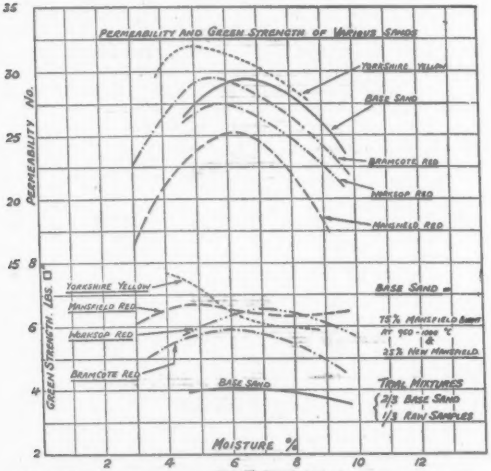


FIG. 8.—RESULTS OF LABORATORY TESTS ON FOUR TYPES OF NATURAL SANDS.

grains over 100 mesh. Samples of these two sands were obtained for testing.

It had been found previously that tests made on raw naturally-bonded sands, either as received or after milling in the laboratory, did not give a definite indication of their ability to re-bond a used sand. For this reason it was decided that the value of the new sands should be determined by assessing their ability to restore green strength to a base sand made by burning some of the clay from a bulk sample of Mansfield, to simulate a low strength backing sand. Samples of Bramcote and Mansfield were included for comparison.

The investigation was carried out in the laboratory by milling separate mixtures of two parts base sand and one part of each of the four raw sands with varying moisture contents, and testing the whole series for permeability and green strength. The results (see Fig. 8) show that maximum permeability occurred in all cases between 5 and 7 per cent. moisture, with a sharp fall on either side, and that the moisture associated with maximum green strength varied somewhat, but was substantially within the same range. The Yorkshire yellow sand was an exception, as it gave maximum green strength at 4 per cent. moisture, being similar in this respect to synthetic sands.

The comparative results, detailed in Table III, of the four sands fell into the order expected from the points already discussed regarding grain size and "spread," and clay content.

TABLE III.—*Permeability and Green Strength of Four Types of Sand*

	Fineness No.	Max. Perm. No.		Per cent. clay grade.	Max. green strength, Lb. sq. in.
Yorkshire yellow	84	32	Yorkshire yellow	17	7.8
Bramcote red	88	29.5	Mansfield red ..	13	6.7
Worksop red	120	27.5	Worksop red	11	6.5
Mansfield red	156	25	Bramcote ..	8	5.9
Base sand ..	—	29.5	Base sand ..	—	4.0

Final Selection of Iron Foundry Sand

Yorkshire yellow gave the highest figures for both permeability and green strength (see Table III), and, as it was desired to have the maximum of both properties and it was known from the sieve-test results that the finish would not be impaired, this was the sand selected. Nevertheless, if it was to be used economically, the facing mixture would only need about 25 per cent. of Yorkshire Yellow to provide sufficient green strength, owing to the high clay content, and, as the losses made about 35 per cent. new sand necessary in the facing, it proved an advantage to retain some Bramcote to provide bulk. Furthermore, whenever supplies of either sand were coarser than usual, a varying quantity of Mansfield was included to adjust the average grain size and retain a good surface finish.

Occasionally heavy castings predominate, causing a weakening of the sand, or moulds containing deep narrow cods require extra bond; in these circumstances about 1 per cent. Fulbond is added in preference to short-period alterations to the standard mixture. With variations due to irregular deliveries and the changes mentioned above, the mixture of Yorkshire yellow (now Pickering Medium) and Bramcote has given satisfaction during the past two years.

Coal Dust

Stress has been laid on the selection of sands to obtain both adequate moulding properties and a good surface finish and, since the presence of coal dust in green-sand facing is a potent agent in providing a smooth casting skin, an investigation to select the most suitable coal dust quickly followed the conclusion of the sand research.

The main purpose of coal dust is to provide a film of gas and a deposit of carbon at the mould face to

diminish penetration by the liquid metal, so a bituminous coal with high volatile matter is desirable. Furthermore, the ash content of the coal should be low, as accumulation in the backing sand leads to trouble due to the low fusion point of coke ash and the resultant reduction of permeability. A reasonab.e specification in normal times would be: Volatile matter, 30 per cent. minimum; ash, 10 per cent. maximum; but at present some modification of these figures has to be accepted. The original requirements as regards grain size also had to be altered, for it was desired that most of the grains should be retained on the 100- and 150-mesh sieves, to match the sand, with a minimum amount of fines so that the permeability should not be lowered, but this proved to be impracticable.

Inquiries were sent to various manufacturers for samples of coal dust to meet the above specification. Twelve samples were received and tested for volatile

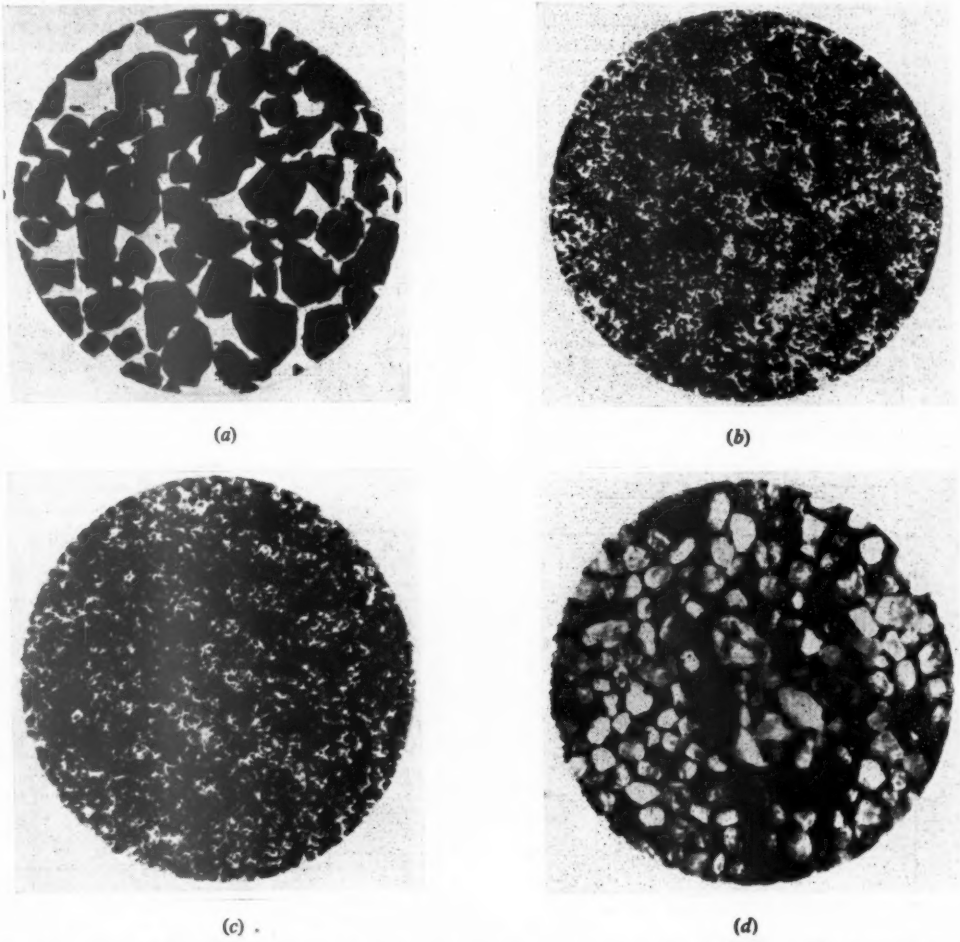
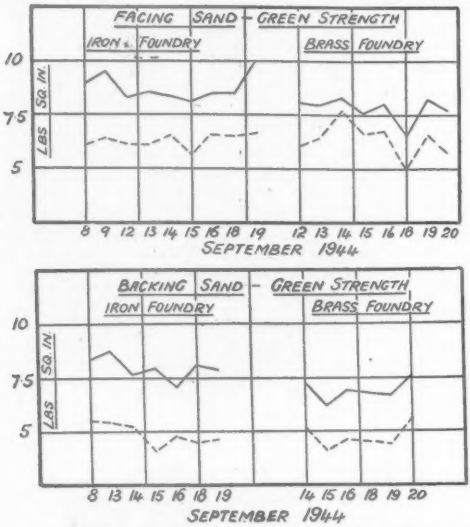


FIG. 9.—COMPARATIVE GRAIN SIZES OF COAL DUST AND MOULDING SAND. (*a*) COARSE COAL DUST, (*b*) MEDIUM COAL DUST, (*c*) FINE COAL DUST, (*d*) IRONFOUNDRY FACING SAND.

Development of Foundry Sand Control

matter, ash and grain sizes. It was noted that none met the requirements in full, neither was there any consistency between different makers' "Coarse," "Medium," "Fine" and "Super Fine." All the samples showed a wide spread of grain sizes—when fines were below 10 per cent. most of the grains exceeded 60 mesh and when the majority of the grains were below 60 mesh the fines amounted to from 40 to 60 per cent. A similar result is obtained when breaking lumps of coal for domestic use—slack is produced each time a lump is broken and, the smaller the final pieces, the greater the proportion of slack.

None of the samples contained less than 10 per cent. ash—a few exceeded 20 per cent.—but in general the volatile matter lay between 30 and 40 per cent. The final specification, therefore, was made on the basis of lowest ash (12 per cent. maximum) and highest volatile matter (35 per cent. minimum), with grain sizes mainly between 44 and 100 mesh, which enabled the manufacturer to limit the fines to about 18 per cent. Although somewhat on the coarse side, this coal dust has given satisfaction during the past two years. Fig. 9 shows the grain sizes of three grades of coal dust, compared with the sand in use, the "Medium" sample being the one selected.



Notes on Milling Time

The need for higher green strength and the introduction of Yorkshire yellow sand in the facing mixture led to an investigation to determine:—

(1) Whether the milling practice used was giving the best results of which the sand was capable; and, if not, (2) to standardise milling conditions to obtain those results.

TABLE IV.—*Influence of Milling Time on Properties of Foundry Sand*

Milling time.	Moisture, per cent.	Green strength, lb. sq. in.	Permeability No.	Shatter, per cent.
5	5.5	7.3	36	60
10	5.5	7.7	39	68
15	5.6	8.6	43	69
20	5.2	9.2	40	70
25	5.0	8.8	44	70
30	5.2	8.8	48	67

Facing sand re-milled in the laboratory mill each day for two weeks showed increases of 2 to 3 lbs. per sq. in. green strength (see Fig. 10). Even after allowing for the efficiency a small mill being greater than a large one, there was obviously room for improvement, and, as a consequence, the foundry mill was overhauled and all worn parts renewed. A test was then made to find the best milling time by testing samples taken at five-minute intervals from a batch of standard facing milled for a period of thirty minutes. The results obtained are given in Table IV.

There was an improvement in properties up to 15 or 20 minutes' milling, with little effect beyond that time, so, with a view to allowing a little margin, 20 minutes was adopted as standard milling time.

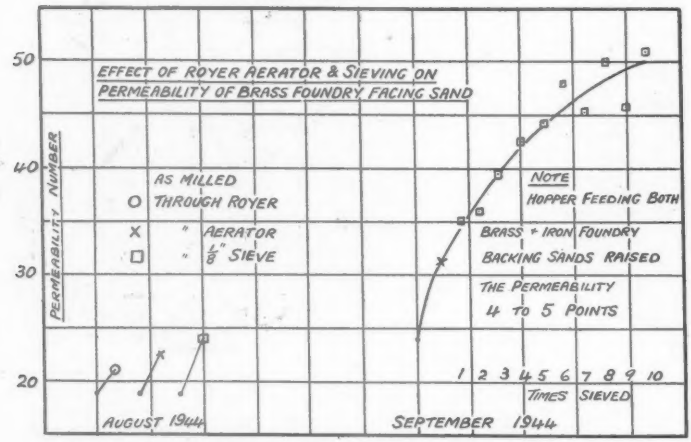


FIG. 10.—EFFECT OF THREE METHODS OF AERATION OF MILLED SANDS.

Effects of Treatment after Milling

When sand testing became a daily routine it was found that the facing sand as-milled was lumpy and gave variable results, so sieving through a $\frac{1}{8}$-in. mesh sieve before testing was adopted as standard practice. It was then found that the sieving operation increased the permeability, even when the facing sand had been through an aerator after milling. In consequence, tests were made to find the effect of putting separate samples of milled facing sand through a Royer, an aerator and a $\frac{1}{4}$-in. sieve, with the results shown in Table V and Fig. 10.

TABLE V.—*Effect of After-Treatment on Milled Sands.*

	As milled.	Through Royer.	Through aerator.	Through $\frac{1}{4}$ in. sieve.
Permeability No.	18.7	21.0	22.5	24.4
Green strength, lb. sq. in. ..	6.3	6.2	6.1	5.6

In all cases the permeability increased without serious loss in green strength. A little later, when the permeability had been raised somewhat, a sample, which had been aerated after milling, was repeatedly sieved, and this process caused a continuous rise in permeability from 31 as-milled and aerated, to 50 after ten sievings (see Fig. 10).

Whilst such a procedure as repeated sieving is impracticable in the foundry, the results confirmed the advantage of thoroughly breaking up the facing sand after milling, and the backing sand after tempering, by means of aerators and Royers. In this connection it was noticeable that when belt conveyors and hoppers were installed for the backing sand the additional disturbance raised the permeability (see Fig. 7).

Trial with Unit Sand

From a labour-saving viewpoint, the ideal method when using hoppers is to supply a unit or system sand to avoid the necessity of adding facing sand to the boxes by shovelsful—approximately 25 per cent. of the total sand used. Unit sand entails the milling of all the sand, although, as a rule, owing to the reduced proportion of new sand to be added, the milling time per batch is much less than when using both facing and backing sands. It follows that all the sand must be of facing sand strength; nevertheless, sand economies may be effected as the repeated milling ensures the full development of the bond in the sand, whereas with single milling the backing sand accumulates undeveloped bond. (See Fig. 10.)

The available milling capacity at the Author's foundry was insufficient to mill all the sand, but a compromise unit sand was tried by feeding the Royer which charged the hoppers with alternate shovelsful of milled facing and backing sands. The trial ran for two days, with frequent tests each day, but it was found that, although the green strength of the facing averaged 6.5 lb. per sq. in., the green strength of the mixture was only equal to the backing sand and was therefore too weak for satisfactory use. (See Fig. 7.) Moreover, the amount of new sand added was double the usual quantity and the heap grew rapidly. As a consequence the trial had to be abandoned, but the labour-saving potentiality of unit sand is still a consideration when milling capacity is adequate for the purpose. Whilst the trial proved a failure, the results emphasised the need for milling sand thoroughly to mix intimately the clay bond with each grain of sand to develop the maximum green strength.

Effect of Moisture on Properties, including Shatter

It is well known that the moisture content has important effects on the properties of green sand. The results of tests given in Fig. 8 showed that peak values for green strength and permeability were obtained with certain moisture contents, but the critical amount varied with different sands and the particular property under tests. On the basis of these results the moisture range for the mechanised sections was fixed at $5\frac{1}{2}$ to 7 per cent., with a bias towards the lower figure to give maximum green strength and a minimum amount of steam evolved during casting. This worked satisfactorily in the main, but the low moisture gave rise to occasional drops when turning over top halves from the 750 lb. machine. In consequence the moisture range was raised to 6 to $7\frac{1}{2}$ per cent. and the trouble disappeared and yet without incidence of scabbing.

About the same period, on the recommendations of Gardom and Sheehan, the author adopted the shatter test as part of the daily routine. It was noticed that when the moisture was higher than usual the green

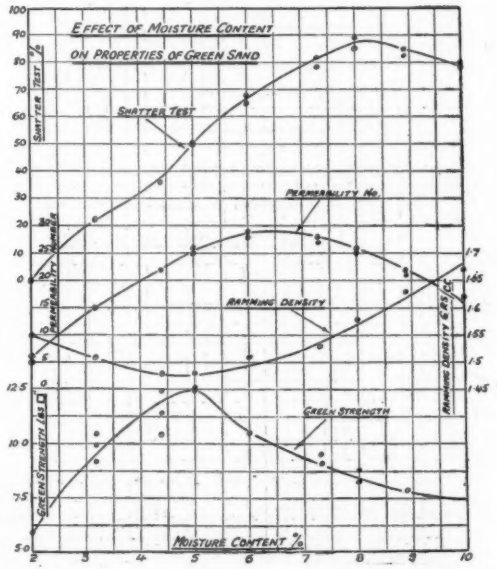


FIG. 11.—EFFECT OF MOISTURE CONTENT ON PROPERTIES OF BACKING SAND.

Development of Foundry Sand Control

strength dropped, but the shatter test was either normal or higher, and this led to an investigation of the effect of moisture on the properties, including shatter, of the sand in use. A series of tests were made on the standard backing sand by milling for five minutes with various moistures from 2 to 10 per cent. The results are shown in Fig. 11. It will be noted that each property reaches a peak at a particular moisture—green strength at 5 per cent., permeability at 6 to 7 per cent. and shatter at 8 per cent. From these results it is obvious no particular moisture can give the best all-round properties, and compromise is therefore necessary. Since high moisture had already proved satisfactory in preventing drops without causing scabs, it was felt that the shatter test gave a more reliable indication of adhesion and mouldability of the sand than the green strength, so the standard moisture range was confirmed at 6 to 7½ per cent. as a means of obtaining adequate shatter values with maximum permeability.

TABLE VI.

	Facing sand.	Backing sand.
Moisture, per cent.	6–7½	6–7½
Green strength, lb. sq. in.	7–9	4–6
Permeability No.	30–40	40–50
Shatter, per cent.	65–80	—

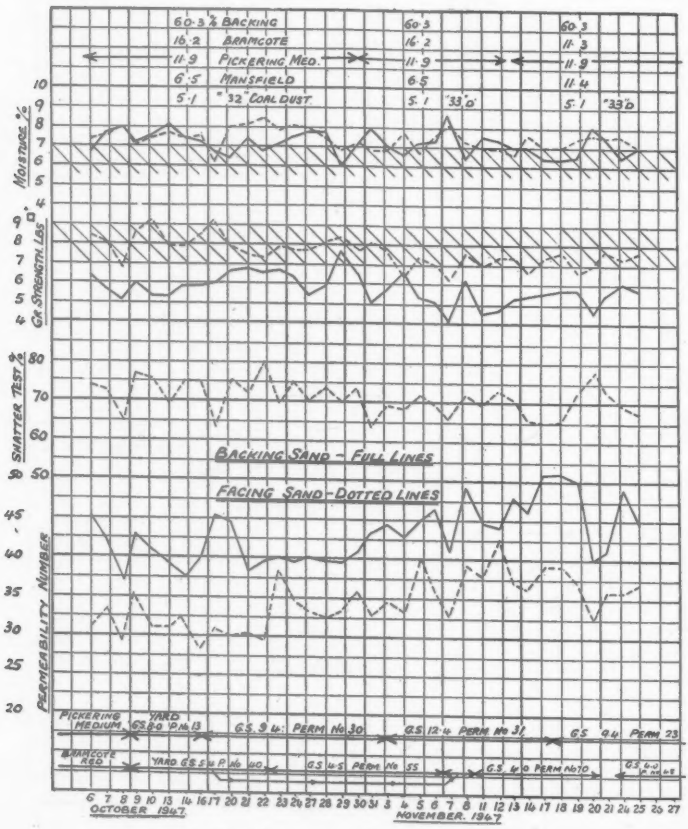


FIG. 12.—PORTION OF SAND CONTROL CHART.

Consideration of Control Chart

Samples of facing and backing sands are taken from each mechanised section at 8.30 each morning and tested for moisture, permeability, green strength and shatter. The limits desired are as Table VI above.

The daily results are recorded on a control chart and supplied to the foundry manager by means of a daily sand report. The chart also includes the green strength, permeability and period of use of each truck of new sand and the sand mixtures, so that the reason for any change in sand properties may readily be located. Fig. 12 shows a portion of the control chart applying to one section.

Day-to-day variations in properties occur due to differences in moisture content and the uncertain properties of the backing sand caused by the wide range of weights and sizes of jobs cast; so, for control purposes, it is the general trends of the results which are important. When the properties of the raw sands vary, the presence of 60 per cent. backing sand in the facing acts as a buffer and the evidence may not be complete for two or three weeks. Nevertheless, evidence of a change is often shown by a sharp alteration in permeability on the first day of using a new truck of sand, as instanced by the results of October 23 and November 12. In the first case the change was desirable as the permeability had been low, but in the second case the permeability reached 43 on the first day and would have increased—with deterioration of surface finish—but for the change of mixture on the following day. These two examples suffice to show that the

Development of Foundry Sand Control

combination of daily records and prompt tests on new trucks of sand enable control of sand properties to be exercised within practicable limits.

Conclusion and Summary

(1) Due to the need for greater output and the shortage of personnel in foundries, increased use of mechanical aids is to be expected.

(2) Power ramming necessitates a more open sand than hand rammed moulds.

(3) Sand control is essential if success is to be achieved in balancing the three factors: adequate green strength with permeability and good surface finish.

(4) Red, yellow or synthetic sands, either used separately or blended, provide alternatives to suit a variety of foundry conditions.

(5) A careful choice of sand may provide all the desired properties and lead to economies by minimising dumping.

(6) Coal dust grading by name has little consistency between different makers, nevertheless a reasonable specification based on analysis and grain sizes can be met.

(7) Daily records of sand results, together with prompt tests of new trucks of sand, make sand control possible between limits to meet the needs of (3) above.

Acknowledgments

The Author wishes to express his indebtedness to the Management of Messrs. Worthington-Simpson, Limited, for permission to publish this paper, and his grateful thanks to his colleagues and his assistants, Mr. R. J. Horton and Mr. E. Palethorpe, for their enthusiastic efforts in producing the data and photographs used in the illustrations.

Latest Statistics

According to the Bulletin of the Council of Iron-foundry Associations, the output of iron castings in 1947 reached the record figure of 2,841,899 tons, with production during the last quarter topping an average of over 3,000,000 tons. The palm for the maximum increase is awarded to the makers of agricultural machinery castings, they registered at 33,000 tons, a 24 per cent. increase. Other noteworthy increases were railway chairs and textile machinery castings, 21 per cent.; motor-car castings, 20 per cent.; solid fuel stoves and grates, 19 per cent.; ingot moulds, 18 per cent.; rainwater pipes, 17 per cent.; iron and steel works plant, 15 per cent.; machine tools castings and electrical castings, 12 per cent.; pipes and fittings, 11 per cent. These figures indicate that, at least, so far as the iron-foundry industry is concerned, the extra 10 per cent. production asked for by the Government is being obtained. Still we want to see 3,300,000 tons as the 1948 figure.

Institute of Metals Medal, 1948

Mr. Robert Crooks Stanley, chairman and president of the International Nickel Company of Canada, Limited, has been awarded the 1948 Institute of Metals (Platinum) Medal in recognition of his outstanding services to the non-ferrous metal industries. He has been with the company and its predecessors since 1901. He has provided the leadership during the Nickel Company's most intensive growth, which has contributed largely to its emergence as one of the world's leading and most successful mining and metallurgical enterprises.

On the organisation of the original International Nickel Company in 1902, Mr. Stanley became assistant superintendent of the Camden (N.J.) works, and, subsequently, superintendent. His energy and ingenuity in changing the Camden plant from an old-world chemical manufacturing works of detached units into an integrated undertaking applying up-to-date metallurgical methods drew early attention, and in 1904 he was transferred to Bayonne as assistant general superintendent of the Orford Copper Company, where again he was responsible for a complete modernisation programme.

In 1917, he was elected a director, and in 1918 vice-president in charge of all operations of the International Nickel Company. When he became president in 1922, on the death of W. A. Bostwick, the nickel industry was at its lowest ebb. One of the initial efforts of Mr. Stanley was the formation of a development and research division, through which thousands of commercial peacetime applications for nickel were established. Thus began probably the most vital phase of growth in the nickel industry. To spur on an increasing demand for nickel, Mr. Stanley arranged for the construction at Huntingdon, West Virginia, of a large modern rolling mill exclusively devoted to high nickel products; he inaugurated a comprehensive mine and plant expansion in Canada and developed the Frood Mine at Sudbury into one of the world's largest mines.

Following the acquisition of the Mond Nickel Company, Limited, Mr. Stanley continued as president and assumed chairmanship of the board of directors on the death of Charles Hayden in 1937.

Mr. Stanley's achievements in the nickel industry have brought to him the award of the Thomas Egleston Medal presented by Columbia Engineering Schools Alumni Association, the award of the first gold medal of the Rand Foundation by the American Institute of Mining and Metallurgical Engineers, and the American Society for Metals Medal for the Advancement of Research, while in 1937 the King of Belgium conferred upon him the Order of Leopold. In September, 1947, Mr. Stanley was awarded the "King's Medal for Service in the Cause of Freedom." This medal was instituted by King George in 1945, "for Civilian Services to the Allied Cause." He has also been awarded the degrees of Sc.D. of Columbia University and the D.Eng. degree of the Stevens Institute of Technology and of the Rensselaer Polytechnic Institute.

The Industrial Organisation & Development Act, 1947

By F. J. Tebbutt

The Industrial Organisation & Development Act, 1947, is a measure which is not altogether well understood, so the following hints are submitted. The Act is designed to establish Development Councils, to consider methods for promoting efficiency and increasing production in the particular industry and to related matters. It should be clearly understood, however, that such a Council has nothing to do with wages or conditions of work, and is expected to be complementary to and not in derogation of trade associations or trade unions. The Act lays down certain functions (there is a list of 20) which a Council can adopt; space forbids details but examples are such things as scientific research, production methods, labour and management problems, marketing, training and technical education of employees, export trade matters including overseas publicity, and so forth. Any or all of these can be selected, and a Council will come into being by an Order of the Board of Trade, or Ministry of Food, or certain other Government departments, and the selected function(s), (mutually agreed upon by the employers and employees concerned) will be included in the Order. Each Council is particular to the trade concerned, and organisations of employers and employees must be consulted before a Council can ordinarily be formed, and no Order can be made unless so desired by a substantial number of persons engaged in the industry.

Special Points

An Order can include the making of a levy on members of the trade field to meet expenditure; to require the giving of certain particulars by members (*e.g.*, production, capacity, assets, staff, output, etc.); and also a register of members can be kept but as regards publication of the particulars mentioned, only a general summary, somewhat on the lines of a census, is allowed not statistics of a particular firm. As regards these latter matters where they are included in an Order, they have obligatory effect under penalties, but in respect of the "functions" mentioned, any recommendations are merely advisory and no one is compelled to do anything in respect of these if the firm or individual does not wish to. Furthermore, a Council has no power to impose conditions as regards entry into the industry or conditions on the sale of goods manufactured, although recommendations can be made by a Council for the voluntary adoption of quality and other standards, certifying marks, and the like.

The Act also provides that even if there is no Development Council, but there is a body to function for matters of scientific research, promotion of export trade, or improvement of design, and the Government department agrees that funds should be available for any of these matters, an Order can be made imposing a levy on members of the trade for the purpose of meeting expenditure in connection with the body. A Council is composed of persons representative of employers

(*Concluded from column* 1.)

or employees (these together to be a majority of the members) with other persons (not of the industry concerned) called "independent members."

Spring Refresher Course

The British Cast Iron Research Association have organised a refresher course, to be held at Ashorne Hill, Leamington Spa, from April 14 to 17. On the first day, Wednesday, April 14, there are to be lectures by Mr. D. Bridgwater on some building and architectural uses of cast iron; Mr. S. W. Palmer on some developments in malleable cast iron, and Mr. J. G. Pearce, who is to give an introductory talk.

The next day, Thursday, there are talks by Mr. W. B. Parkes on the present position and future trend of moulding sands; Mr. L. W. Bolton on cupola control and practice; Mr. W. J. Driscoll on fuel economy; Dr. H. T. Angus on control in the foundry; Mr. W. B. Parkes on sand control methods; Mr. H. Morrogh on methods of making ladle additions to cast iron, and Mr. G. R. Woodward on sources of information.

The Friday's programme includes Mr. Morrogh on sulphur in cast iron; Dr. Angus on shrinkage and porosity; Mr. J. W. Gardom on mechanisation in the small foundry; Mr. Morrogh on graphite formation in cast iron; Mr. J. W. Grant on mechanical properties of cast iron; Mr. J. G. Pearce on metallurgical developments in the last fifteen years, and Mr. Morrogh on nodular cast iron. The last day, Saturday, there are talks by Mr. W. Westwood on corrosion of cast iron; and in association with Mr. A. Mayer on rapid methods of chemical analysis; Mr. A. Argyle on spectrochemical analysis, and Mr. D. Marles on metallographic identification.

Details of the course are available from the B.C.I.R.A. at Bordesley Hall, Alvechurch, Birmingham.

High Wages Sought

Speedy implementation of the reform charter for the foundry industry and an immediate wage increase of 30s. a week were urged by foundry workers in Northern Ireland and West of Scotland, meeting in Glasgow recently. Mr. James Gardner, general secretary, Amalgamated Union of Foundry Workers, contended that the improvements in working conditions would do more than anything else to increase production. The resolution declared that the danger of the skilled section of the industry being undermanned made it imperative that such an inducement should be given to assist in recruiting apprentice labour.

Adoption of the charter is overdue, as the majority of employees are working under quite onerous conditions. Several firms have reorganised the foundries and have included welfare services, such as baths, canteens and clinics, which have been much appreciated by the men. It will take time to educate the industry to the importance of the reforms in relation to national production and individual well-being, but this can be achieved in two or three years, as has been proved by experience in mining.

Steel Scrap from Germany

Danger that Increased Tonnage needed may not Materialise

Fears that the hoped-for increase in supplies of scrap from Germany may not materialise are expressed by the Select Committee on Estimates in a report just published. Witnesses heard on the subject included representatives of the Iron and Steel Board, Iron & Steel Disposals, Limited, and the British Iron and Steel Federation.

The scrap metal available in Germany is of three kinds: reparations scrap, commercial scrap and booty scrap. Reparations scrap is obtained by means of bids which are presented to the Inter-Allied Reparations Agency in Brussels; and, if the bid is accepted, is collected under arrangements for which the Reparations Deliveries and Restitution Division of C.C.G. is responsible. Commercial scrap is purchased from German sources under contract placed by the Commerce Division of the Control Commission. In this the Commerce Division act as agents for the Ministry of Supply. Booty scrap is collected under arrangements made by the Disposals Group of C.C.G. which has been organised for this purpose.

Responsibility of the authorities in Germany ceases at the ports. The Scrap Export Agency have depots at the ports (Hamburg, Emden, Kiel and Bremen) and take over responsibility for all forms of scrap. The Scrap Export Agency is an agency maintained by Iron & Steel Disposals, Limited, which company (non-dividend paying) was formed in July, 1943, to secure supplies of heavy steel scrap. The Agency works in close touch with C.C.G. and obtains labour through them. The Transport Branch of the Ministry of Supply, acting for Iron & Steel Disposals, Limited, arranges for the necessary sea transport. In case of difficulty the Ministry of Transport is called in.

All scrap is disposed of in the United Kingdom by Iron & Steel Disposals, Limited, which acts under control of the Iron and Steel Board.

Reparations and Commercial Scrap

Reparations scrap is scrap arising, for example, from machine tools which the Germans are required to surrender and for which no bid is made by the Allied Commission for re-use.

Commercial scrap is the scrap arising from normal industrial operations and belongs to German scrap merchants, of whom there are about 600, organised into a body known as V.S.E. (Verwaltung für Stahl und Eisen). Negotiations for commercial scrap contracts are carried on between the Control Commission, in consultation with the Americans, and V.S.E., which works in very close co-operation with the German economic authorities, especially with the Minister for Economic Affairs at Frankfurt. Contracts covering 450,000 tons, at £3 a ton, were signed a year ago; of these, all have been fulfilled except for a balance of 70,000 tons which still remains due and which is coming forward at a monthly rate of 5,000 tons from one particular German works. Contracts are signed by Iron & Steel Disposals, Limited, and payment is made by that body to the Joint Export-Import Agency in Germany.

Recently, however, it has been difficult to place further satisfactory contracts. There are two reasons for this. First, German firms are unwilling to sell scrap, which is an asset of considerable value, for marks of doubtful worth. Secondly, it has lately proved difficult to reach agreement with the German economic authorities on the sterling price. The price in the United Kingdom is £3 10s. a ton, but in the U.S.A. it has been fluctuating between £7 and £11 a ton. These ranges of price provide room for argument and negotiation, but it is now hoped that contracts for 100,000 tons to be delivered in the first quarter of 1948 will be signed very soon.

Booty Scrap

Booty scrap, as its name implies, comprises warlike material of all kinds. It is collected in Germany by the Disposals Group of the Control Commission, which arranges for the scrap to be cut to furnace size before it is sent to the depots of the Scrap Export Agency at German ports. There is close liaison between the Disposals Group and Iron & Steel Disposals, Limited, which also helps in the actual cutting of the scrap and has in Germany its own team of ex-Pioneer Corps men experienced in ship-breaking and salvage work. The export of this scrap has been considerably increased during recent months, and it is hoped that next summer the amount exported will be about double the amount which was exported last year. The great difficulty which has to be overcome, in order to increase the amount of scrap so exported, is that of shortage of labour and equipment. Seven thousand more men are required, and, moreover, the labour which is available is underfed, and therefore output is well below the maximum. It is not possible to give these men the heavy workers' ration owing to the repercussions which would ensue in the form of similar claims from other workers. At Hamburg, however, the men engaged on this work at the docks receive a mid-shift meal, consisting of a bowl of broth, and it is noteworthy that loading here is more rapid than elsewhere; but it must be remembered that Hamburg has better loading facilities than other ports, and the provision of extra food must not be put down as the sole reason for improvement. Shortage of labour is aggravated by shortage of equipment, especially of boots, leather gloves, oxy-acetylene equipment, heavy cutters, cranes and similar essential machinery. Some of these requirements, particularly cranes and heavy cutters, are now coming from the United Kingdom and others are being made in Germany.

The Disposals Group itself has also been handicapped from the beginning by shortage of staff. The required establishment was put forward in May, 1947, but it was not sanctioned until September; it is now being slowly filled, but meanwhile the branch is having to operate with only 45 per cent. of the necessary personnel. In view of this shortage of staff in the Disposals Group and the lack of German labour able and willing to do the work, it was suggested that more use might have been made of the ship-breaking and

salvage firms in the United Kingdom, which might have done the work under contract. It was stated in evidence before the Select Committee that experts and representatives of these firms have in fact paid many visits to Germany, but until recently these firms had been fully occupied in clearing other areas, such as the Normandy beaches. As the bulk of the scrap now being obtained is coming from disarmament material and not from salvaged ships, it was maintained that their services were unnecessary.

Scrap for Pig-iron Manufacture

A memorandum submitted to the Select Committee by Sir John Duncanson, Commercial and Technical Director of the British Iron and Steel Federation, points out that the Marshall plan provides for the use of scrap in German blast furnaces in order to economise in coke consumption and to enrich the furnace burden to give increased iron production. Since the quality of basic slag for fertiliser must be maintained as high as possible, the amount of scrap which can be used in blast furnaces making Thomas iron is strictly limited. The amount of scrap so used would be about 5 per cent. On the other hand, much larger proportions of scrap can be usefully charged into furnaces making other qualities of iron, and charges of 22½ per cent. of scrap would be used in these furnaces for the years 1948 and 1949, and 20 per cent. for 1950 and 18 per cent. for 1951 and thereafter.

German Scrap Requirements for Blast Furnaces.
(In thousands of tons.)

	Pig-iron production, Marshall plan.			
	1948.	1949.	1950.	1951.
Total Pig-iron ..	3.590	4.760	6.525	8.700
Thomas iron	2.240	3.025	4.125	5.500
Open-hearth and other iron	1.350	1.735	2.400	3.200
Scrap required for :				
Thomas iron—5% ..	112	150	206	275
Other iron	304 (22½%)	390 (22½%)	480 (20%)	576 (18%)
Total scrap ..	416	540	686	851

The specifications for scrap used in blast furnaces for quality other than hematite, can be much wider than that used for steelmaking and practically any type of scrap within a limited range of alloy content can be used. The scrap required for this purpose would be supplied from the normal scrap merchants' collection of obsolete plant, scrap from consumer goods, and ordinary wear and tear.

The total requirements of scrap for iron and steel making for the four years, from sources external to the steelmaking and fabricating industry, are estimated to be as follow:—1948, 773,000 tons; 1949, 525,000; 1950, 666,000; 1951, 826,000 tons.

The abnormal use of scrap in 1948, due to limited fuel supplies and low production level of operating units, and the gap between steelmaking and the return of scrap, can be readily met by the use of the large accumulated stock of scrap which was estimated at December 1, 1947, at about 850,000 tons at the steelworks and scrap merchants' yards. The quantities required from 1949 onwards are well below the amount of scrap which should be available through the scrap merchants from normal obsolesence and wear and tear. In the estimates for scrap supplies in the United Kingdom, this scrap is assessed at about 14 per cent. of the ingot production. Assuming only 10 per cent. in Germany, due to delay of normal replacement and similar causes, the amount of scrap so available would be of the order of 550,000 tons in 1949 rising to one million tons in 1951 and thereafter.

The programme of iron and steel manufacture will therefore, Sir John Duncanson concludes, make no demand on the large quantities of scrap, estimated at 4 or 5 million tons, lying about in Germany and not yet collected by the scrap merchants.

A.E.C. Bid for Crossley Motors' Shares

Shareholders of Crossley Motors, Limited, have been informed that the Associated Equipment Company, Limited, has made an offer to acquire the issued shares of the company. One unit of £1 ordinary stock of the A.E.C. would be issued to accepting Crossley shareholders in exchange for every five shares of 4s. each. The offer is conditional on the acceptance by the holders of 90 per cent. at least of the 1,500,000 Crossley shares not later than March 22 and is subject to authorisation on April 5 by a general meeting of the Associated Equipment Company.

The A.E.C. stock issued to Crossley shareholders would rank for any dividends declared by A.E.C. after March 22 and would carry all the rights of and be identical with the existing stock. If the offer is accepted by the requisite majority of shareholders the Crossley Company would declare on March 22 an interim dividend of 7½ per cent. A.E.C. would take over the shares without the benefit of such interim dividend, so that the Crossley shareholders would receive the 7½ per cent. dividend in addition to all future dividends to be declared by A.E.C.

If all the Crossley shareholders accept, the A.E.C. directors propose to create and issue 300,000 fully-paid shares which will be converted into stock. Treasury consent has been obtained.

Follsain Metals' Shares

At a meeting of Follsain Metals, Limited, to be held at Lutterworth to-morrow (Friday), a resolution will be submitted for the sub-division and consolidation of the shares. This was envisaged in the capital reduction scheme which was approved by shareholders on December 30 last. The 196,560 6 per cent. participating preference shares of 3s. each are to be sub-divided into 1s. shares and then consolidated into 10s. shares. The 811,007 1d. ordinary shares are to be consolidated into 10s. shares and the 188,993 1s. ordinary shares (at present unissued) are also to be consolidated into 10s. shares. The 12,408 6 per cent. participating preference shares of 10s. (at present unissued) are to be converted into 12,408 10s. ordinary shares.

Price-fixing Policy

New Orders Signed

Mr. Harold Wilson, President of the Board of Trade, has signed 14 Orders designed to give effect to the Government's "price-freezing" policy. They will come into effect on March 15 and are now available from the Stationery Office.

The principal Order is the Miscellaneous Goods (Maximum Prices) Order, 1948, which fixes manufacturers', importers', wholesalers', and retailers' maximum prices on 29 types of goods of a domestic nature. It covers, broadly, those classes of goods which formerly were controlled under the Prices of Goods Act, 1939, and have not come under arrangements entered into between manufacturers and the Central Price Regulation Committee. For manufacturers the maximum price chargeable is fixed for each individual at the lowest price charged by him for similar goods during the two months ended January 31 last, which will be known as the basic period. A manufacturer selling goods which are not similar to any that he sold in the basic period will only be permitted to charge the cost of materials plus a certain percentage. Wholesalers' and retailers' maximum prices are fixed at the price they paid for the goods plus the percentage margins they added in December, 1947, or a fixed percentage (shown in the schedule to the Act), whichever is the lower.

Goods covered by the Miscellaneous Goods (Maximum Prices) Order, 1948, include the following:—

Safes, plan cabinets and metal office equipment; typewriters, calculating machines and other office machinery and cash registers, and component parts thereof and accessories therefor; electric wire and flex of a kind used for office or domestic purposes; portable lamps and hand torches; aluminium hollow-ware; (*a*) Goods marked "H" or "C" in accordance with the provisions of Article 4 of the Hollow-ware and Kitchen Hardware (Control of Manufacture and Supply) Order, 1947 (*a*); (*b*) goods not so marked; electric clocks and electric fans of a kind used for domestic or office purposes; gas or electrically operated domestic or office appliances and apparatus (*a*) for preparing, cooking, heating or refrigerating food or drink, and (*b*) for heating, ventilating, cleaning or washing; similar appliances and apparatus (not operated as aforesaid) the fixing of which is normally undertaken by trade craftsmen; nails, screws, nuts, bolts, washers and rivets; articles of hardware and ironmongery for domestic or office use, the fixing of which is normally undertaken by trade craftsmen.

Domestic hollow-ware made wholly or mainly of metal other than aluminium is excluded from the Order.

THE LARGEST POST-WAR FACTORY to be built by Scottish Industrial Estates, Limited, is nearing completion at Newhouse, Lanarkshire, and is being erected to the requirements of Vactric, Limited, engineers, at an estimated cost of £500,000. Altones, Limited, is to develop a new aluminium process in a smaller factory on the same estate.

Awards for Metallurgical Papers

The dearth of Papers on processes and plant used in extraction metallurgy in the "Transactions of the Institution of Mining and Metallurgy," and of Papers on processes and plant used in the fabrication of non-ferrous metals in the "Journal of the Institute of Metals," has prompted the directors of Capper Pass & Son, Limited, Bristol, to offer to these bodies the sum of £200 per annum for a period of seven years. The sum of £100 per annum will be available for one or more awards to the authors of Papers on some aspect of non-ferrous extraction metallurgy, while a similar amount will be available for one or more awards to the authors of Papers relating to some process or plant used in the extraction or fabrication of non-ferrous metals. The Papers must be contributed by persons engaged full time in industry or practice.

The Councils of the Institution of Mining and Metallurgy and of the Institute of Metals have accepted the offer, and have appointed a joint Adjudicating Committee which has power to make the awards on behalf of the two organisations and may, at its discretion, make no award or awards of less than the money available if, in its opinion, the quality or number of Papers submitted in any year fails to reach a suitable standard. Any sums not awarded will be carried forward to future years.

Institute of Metals Medal for Mr. R. C. Stanley

The Institute of Metals has awarded its platinum medal for 1948 to Mr. Robert Crooks Stanley, chairman and president of the International Nickel Company of Canada, Limited, in recognition of his outstanding services to the non-ferrous metal industries. Mr. Stanley has been associated with the company and its predecessors since 1901. "Monel," the white alloy of nickel and copper, owes its discovery in 1905 to Mr. Stanley, who conceived and developed the process for producing the alloy direct from ore without separating the nickel and copper. In the last war he was responsible for greatly increasing nickel production. He was elected an ordinary member of the Institute of Metals in 1928.

Scientific Instrument Makers' Placing

A new company, Hilger & Watts, Limited, has been formed to amalgamate the three old-established firms of E. R. Watts & Son, Limited, manufacturers of mining and surveying instruments, Adam Hilger, Limited, scientific instrument makers, and James Swift & Son, Limited, manufacturers of microscopes for metallurgical research. Application is being made for a quotation for the whole of the company's 187,500 5 per cent. preference £1 shares, about 161,000 of which have been subscribed for by the C.M.W. Trust and are to be placed in the market at 21s. 3d. each.

Imports and Exports of Iron and Steel

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in January. Monthly averages for 1938 are given for purposes of comparison.

Total Exports of Iron and Steel.

Destination.	Month ended January 31, 1947.	Month ended January 31, 1948.	Monthly average. 1938.
	Tons.	Tons.	Tons.
Eire	5,946	6,125	4,643
Channel Islands	451	942	618
Gibraltar	48	434	74
Malta and Gozo	469	420	192
Cyprus	107	475	138
Palestine	5,599	3,380	673
British West Africa	5,342	4,972	4,145
Union of South Africa	15,925	13,590	19,256
Northern Rhodesia	160	178	1,714
Southern Rhodesia	2,472	333	3,018
British East Africa	2,031	7,700	2,161
Bahrein, Koweit, Qatar and Trucial Oman	569	1,947	*
India, Pakistan, etc.	8,029	6,630	13,222
British Malaya	6,610	1,545	5,549
Ceylon	1,350	1,200	2,169
North Borneo	506	972	9
Hong Kong	2,100	1,320	1,966
Australia	5,101	5,644	14,241
New Zealand	5,100	6,526	10,990
Canada	450	916	7,117
British West Indies	4,269	2,217	3,687
British Guiana	256	185	249
Anglo-Egyptian Sudan	118	1,296	691
Other British countries	1,701	1,206	1,164
Soviet Union	604	—	362
Finland	4,377	3,974	1,467
Sweden	9,631	7,487	998
Norway	4,987	5,006	1,689
Iceland	734	365	55
Denmark	10,062	8,485	7,271
Poland	53	30	207
Netherlands	9,047	7,498	4,297
Belgium	2,205	1,057	1,694
France	2,171	2,152	1,116
Switzerland	1,076	1,571	232
Portugal	2,534	2,498	643
Spain	927	511	647
Italy	11	225	428
Hungary	—	34	3
Czechoslovakia	34	30	193
Greece	3,109	418	146
Turkey	1,466	1,227	1,146
Dutch East Indies	1,793	3,387	2,276
Dutch West India Islands	1,098	775	205
Belgian Congo	242	106	25
Algeria	497	15	4
Portuguese East Africa	533	75	1,185
Syria	399	90	217
Lebanon	201	521	
Egypt	4,941	4,498	2,867
Iraq	7,110	3,895	2,145
Iran	7,414	8,080	9,197
Burma	4,822	4,282	1,543
Siam (Thailand)	413	280	500
China	3,475	3,473	1,873
U.S.A.	1,316	269	182
Cuba	31	404	60
Colombia	1,453	550	318
Venezuela	2,854	5,553	390
Ecuador	171	225	133
Peru	214	744	253
Chile	776	1,450	524
Brazil	4,266	1,257	1,416
Uruguay	665	1,082	632
Argentine	5,150	7,878	6,613
Other foreign countries	3,455	2,913	6,818
Total	181,026	164,523	159,656

* Included in "Other British countries" and "Other foreign countries."

Total Imports of Iron and Steel.

From	Month ended January 31, 1947.	Month ended January 31, 1948.	Monthly average, 1938.
	Tons.	Tons.	Tons.
Australia	1,501	6,495	3
Canada	3,817	4,703	9,781
Other British countries	583	49	13,434
Sweden	785	1,203	7,483
Norway	2,869	2,013	2,814
Germany	16	235	8,000
Belgium	1,017	4,101	22,806
Luxemburg	—	145	4,883
U.S.A.	15,303	13,388	16,724
Other foreign countries	1,989	1,948	26,090
Total	27,880	34,280	112,023
Iron ore and concentrates—			
Manganiferous	9,100	—	5,190
Other sorts	566,288	674,018	425,156
Iron and steel, scrap and waste, fit only for the recovery of metal	15,104	47,956	52,684

Exports of Iron and Steel by Products.

Product.	Month ended January 31, 1947.	Month ended January 31, 1948.	Monthly average, 1938.
	5,632	4	7,828
Pig-iron			
Ferro-alloys, etc.—			
Ferro-tungsten	41	106	43
Spiegeleisen & ferro-manganese	4,229	989	433
All other descriptions*	64	65	87
Ingots, blooms, billets and slabs	32	506	812
Iron bars and rods	445	339	266
Sheet and tinplate bars, wire rods	241	654	1,297
Bright steel bars	2,747	2,106	549
Other steel bars and rods	17,238	11,265	8,500
Special steel	1,555	1,893	411
Angles, shapes and sections	10,729	6,550	5,573
Castings and forgings	493	547	135
Girders, beams, joists and pillars	3,957	2,265	2,789
Hoop and strip	4,566	3,316	3,115
Plates, ⅜ in. thick and over	14,383	8,869	10,913
Black plates	3,537	5,612	1,211
Black sheets	3,487	2,988	5,292
Galvanised sheets	4,719	5,185	12,244
Tinplates	13,830	16,992	26,608
Tinned sheets	155	511	117
Terneplates	116	4	360
Decorated tinplates	123	76	364
Other coated plates	274	265	19
Cast-iron pipes, up to 6 in. dia.	3,814	6,980	4,077
Do., over 6 in. dia.	3,129	4,036	3,580
Wrought-iron tubes	22,214	23,695	18,332
Radiators and central-heating boilers	386	333	336
Railway material	15,778	12,605	13,179
Wire	7,140	3,557	4,599
Cable and rope	1,993	2,316	1,367
Netting, fencing and mesh	855	1,714	785
Other wire manufactures	993	473	306
Nails, tacks, etc.	649	723	317
Rivets and washers	670	669	711
Wood screws	322	570	209
Bolts, nuts and metal screws	2,431	1,973	1,464
Stoves, grates, etc. (excl. gas)	548	1,055	583
Do., gas	121	286	178
Sanitary cisterns	73	143	234
Fencing material	456	266	427
Anchors, etc.	844	791	528
Chains, etc.	938	694	524
Springs	520	381	328
Hollow-ware	5,663	9,086	892
All other manufactures	18,896	21,070	17,734
Total	181,026	164,523	159,656

* The figures for 1938 are not completely comparable with those for subsequent years.

Personal

MR. R. P. CREAGH has been elected a director of Simms Motor Units, Limited, East Finchley, London, N.2.

MR. L. G. HARRIS has retired after 24 years as rolling-mill manager of Bayliss, Jones & Bayliss, Limited, Wolverhampton.

MR. H. S. HASLAM has been elected a director of English Clays Lovering Pochin & Company, Limited, St. Austell, Cornwall.

MR. R. F. MCINNES, who joined Aidas Electric, Limited, Greenford, as an engineering assistant in 1933, has been appointed a director of the company.

MR. A. A. ARNOLD, MR. E. PHILLIPS, and MR. W. R. EDWARDS have been appointed additional directors of the John Thompson Engineering Company, Limited, Wolverhampton.

MR. WILLIAM PATTISON, chief buyer for Warner & Company, refined pig-iron makers, of Middlesbrough, has received presentations to mark his completion of 50 years with the company.

MR. A. H. BRADDOCK, who is employed in the rail bank department of the Cargo Fleet Iron Company, Limited, Middlesbrough, is the new president of the Iron and Steel Trades Confederation.

MR. JAMES COWAN, works manager of the Motherwell Bridge & Engineering Company, Limited, has received a presentation from the works foremen to mark the occasion of his 21st anniversary as works manager.

MR. J. C. CRICHERR-BULLOCK has been elected a director of Braid Bros., Limited, aircraft-component manufacturers, sheet-metal workers, etc., of Colwyn Bay, in succession to MR. G. J. P. SAUNDERS, who has resigned.

MR. VICTOR W. BONE, managing director of Ruston & Hornsby, Limited, engineers, boilermakers, etc., of Lincoln, has been elected to the additional appointment of chairman in succession to the late Mr. G. R. Sharpley.

MR. J. L. BROCKHOUSE, managing director of J. Brockhouse & Company, Limited, spring and axle manufacturers, etc., of West Bromwich, has been elected chairman of the company in succession to the late Mr. E. B. Burton.

MR. JOSEPH WALTON, an assistant managing director of Thos. W. Ward, Limited, Sheffield, has been appointed chairman and managing director, and MR. PHILLIP T. WARD, a director, of the Darlington Railway Plant & Foundry Company, Limited.

MR. ROBERT W. LAMONT, managing director of Watson, Laidlaw & Company, Limited, manufacturers of sugar and laundry machinery, of Glasgow, left Prestwick on February 21 for Montreal on the first leg of a 40,000-mile round-the-world air trip.

MR. C. J. BRYANT, assistant secretary to the Bryan Donkin Company, Limited, mechanical and gasworks plant engineers, etc., of Chesterfield, has completed 50 years' service with the company and has been presented with a cheque by the directors and staff.

MR. MATTHEW E. SWAIN has been appointed chairman of Matthew Swain, Limited, ironfounders and cast-iron hollow-ware manufacturers, of Manchester, in succession to the late Mr. John Swain. MR. RICHARD CRAWSHAW, general manager of the company, has been elected to the board.

MR. DAVID F. TANNER has been appointed assistant administrator with Albion Light Metal Products, Limited, Dundee. For the past three years he has been in charge of the costing and statistical department of Barr & Stroud, Limited, manufacturers of scientific instruments, of Glasgow.

MR. L. E. SMITH, chairman of Smith's Dock Company, Limited, North Shields, who is in his 80th year, is to resign from the chairmanship of the company. He will retain his seat on the board. Mr. Smith has been chairman for 34 years and will be succeeded by SIR TRISTRAM EDWARDS, deputy chairman.

MR. FRANK W. BELL, export manager of Robey & Company, Limited, engineers and boilermakers, of Lincoln, has been appointed a director of the company. He commenced his apprenticeship with the company in 1923 and has since occupied positions both in a technical and sales capacity. Mr. Bell was on flying duty with the Air Transport Auxiliary during the war.

PROF. CECIL H. DESCH, F.R.S., honorary scientific adviser to the Iron and Steel Research Council, left for Belgium on February 27 to lecture for the British Council at Ghent and other universities on "Recent Advances in Steel." Prof. Desch had been invited by the Belgians to undertake this visit in furtherance of the terms of the recently signed Anglo-Belgian Cultural Convention.

Parliamentary

Scrap Shortage

MR. SHARP asked the Minister of Supply how many blast furnaces had been closed down this year; to what extent this was due to the shortage of scrap; to what extent this shortage was due to the failure to obtain expected supplies from Germany; and what supplies were now likely to be made available from Germany during 1948.

MR. G. R. STRAUSS, in reply, said that one blast furnace had been closed temporarily this year for relining and not because of a shortage of scrap. He could give no reliable forecast of the amount of scrap we were likely to get from Germany.

Subsidies to Private Industry

Replying to a question by MR. LONGDEN, the CHANCELLOR OF THE EXCHEQUER (Sir Stafford Cripps) said that subsidies to private industry for the year 1947-48 included the following:—Iron and steel, £7,500,000; ferro-chrome, £100,000; magnesium, £250,000; aluminium, £750,000; coal stocking, £350,000; fuel oils and kerosene, £25,000.

News in Brief

THE NORTH BRITISH LOCOMOTIVE COMPANY, LIMITED, Glasgow, has received a contract for five locomotives from Nyasaland Railways.

THE SPRING MEETING of the refractory materials section of the British Ceramic Society will be held at Newcastle-upon-Tyne on May 12 and 13.

THE NAME OF Green Smith & Brook, Limited, machinery manufacturers, engineers, etc., of Ampthill, Beds, has been changed to G. R. Green, Limited.

LAUNCHES FROM THE Tyne in January comprised only two ships of 11,037 gross tons, compared with eight vessels of 24,222 tons in January of last year.

PLANS HAVE BEEN APPROVED for converting a former food storage depot at Stanhope, Co. Durham, into an ironfoundry for George Blair & Company, Limited, Gateshead.

THE FURNESS SHIPBUILDING COMPANY, LIMITED, Haverton Hill-on-Tees, has secured contracts for a tanker of 24,000 tons d.w. from United States owners and for a tanker of 16,000 tons d.w. from a Swedish firm.

ORDERS FROM PORTUGAL for two new motor vessels of 2,000 tons d.w. have been received by the Grangemouth Dockyard Company, Limited. Machinery for both will be provided by Aitchison Blair, Limited, Clydebank.

A NUMBER OF blast furnacemen of the Consett Iron Company, Limited, Co. Durham, have withdrawn a threat to take strike action because of alleged preferential treatment for men employed on another furnace at the works.

A SLIGHT EXPLOSION occurred on February 22 at the works of the Cargo Fleet Iron Company, Limited, Middlesbrough, when molten metal escaped from a blast furnace. No one was injured. The furnace was due to close down in a few days.

PLANS FOR recruiting shipyard workers from Northern Ireland to Tees-side yards are being made by the Ministry of Labour. Other shipbuilding centres on the North-East Coast are not likely to be involved, as there is no overall shortage of men in those areas.

A BRITISH COUNCIL shipbuilding course began at Newcastle-upon-Tyne on February 23, and is being attended by 18 students from Denmark, Finland and Norway, and two senior officials of the Gdansk shipyard, Poland. The course will be moved to Glasgow, where it will continue until March 11.

RECENT SHIPBUILDING ORDERS include a 24,000-ton motor tanker to be built by Harland & Wolff, Limited, Belfast, while the Burntisland Shipbuilding Company, Limited, has received a contract for a cargo liner of 2,350 tons d.w., which is to be engined by British Polar Engines, Limited, Glasgow.

THE TYNE IMPROVEMENT COMMISSION has informed Thos. W. Ward, Limited, Sheffield, that there are no berths available in the Tyne which could be used for breaking up capital ships. It is understood that the company has been asked by the Government to break up a number of ships listed for scrapping.

Contracts Open

The dates given are the latest on which tenders will be accepted. The address is that from which forms of tender may be obtained.

Aylesbury, March 15—Iron castings (gulley grates, weirs and manhole covers), for the County Council. The County Surveyor, County Offices, Aylesbury.

Beckenham, March 15—Cast-iron steel or reinforced-concrete street lighting columns, for the Borough Council. The Borough Engineer, Town Hall, Beckenham.

Bedworth, March 16—Gulley grids and frames, for the Urban District Council. Mr. D. Blenkinsop, engineer and surveyor, 134, Newtown Road, Bedworth, near Nuneaton.

Haverfordwest, March 15—Construction of approx. 1,170 yds. of spun-iron pipe varying from 4 in. to 3 in. dia., and approx. 530 yds. of 1¼-in. wrought-iron galvanised supply pipe, etc., for the Rural District Council. J. Taylor & Sons, engineers, Artillery House, Artillery Row, Westminster, London, S.W.1. (Fee £2, returnable.)

High Wycombe, March 16—Manhole covers and frames, gulley grates and frames, etc., for the Corporation. Mr. J. A. Parkinson, borough engineer, Municipal Offices, High Wycombe.

March, April 21—(i) Construction of about 16,500 yds. of spun-iron and stoneware pipe sewers, etc., and (ii) construction of main pumping station and storm-water tanks, for the Urban District Council. W. H. Radford & Son, consulting engineers, Albion Chambers, King Street, Nottingham. (Fee £3 3s., returnable.)

Middleton, March 22—Iron castings (manhole covers, etc.), for the Borough Council. The Borough Engineer, Town Hall, Middleton.

Salford—Supply 332 yds. of 30-in. dia. cast-iron main, 68 yds. of 30-in. dia. mild-steel main, etc., for the Town Council. The Gas Engineer, City Gas Offices, Bloom Street, Salford.

Consumption of Non-ferrous Metals

Detailed figures of the consumption of non-ferrous metals in the United Kingdom during the fourth quarter of 1947 have been issued by the Directorate of Non-ferrous Metals. Consumption of virgin metal for the third and fourth quarters of 1947, together with the totals for the year, was as follows:—

	Third quarter, 1947.	Fourth quarter, 1947.	Total, 1947.
	Tons.	Tons.	Tons.
Zinc	54,545	62,020	223,212
Lead ..	45,650	49,346	177,768
Tin	6,346	7,518	27,384
Cadmium ..	129	116	498
Antimony ..	1,545	1,349	5,302

AGREEMENT HAS BEEN REACHED to stagger annual holidays in shipbuilding and engineering industries in the Tyne and Blyth area.

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STANTON MACHINE CAST PIG IRON

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WEIGHT	80-90 lbs.
Length	22 inches
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STANTON, HOLWELL & RIXONS BRANDS

THE STANTON IRONWORKS COMPANY LIMITED NEAR NOTTINGHAM

Company News

(Figures for previous year in brackets.)

Qualcast—Interim dividend of 20% (same).

Gerrard Industries—Second interim dividend of 15%.

Mather & Platt—Final dividend of 7%, making 11% (same).

Electrical Components—Interim dividend of 7½% (same).

Crabtree Electrical Industries—Interim dividend of 5% (same).

J. & E. Hall—Final dividend of 7½% (10%), making 10% (same).

Woodhouse & Rixson—Dividend of 10d. per unit of stock for 1947.

Electrolytic Zinc Company of Australasia—Interim dividend of 6% (same).

John Oakey & Sons—Final dividend of 10% and bonus of 2½%, making 15% (same).

Small & Parkes—Final dividend of 10% (same) and bonus of 10% (5%), making 30% (25%).

Delta Metal Company—Dividend of 12%, tax free (same) and diamond jubilee bonus of 25% (10%), tax free.

Ratcliffs (Great Bridge)—Second interim dividend of 20%, making 35% (same). No final dividend will be proposed.

Noble & Lund—Final dividend of 27½%, making 42½% (same). The company was made public in March, 1947.

Murex—Interim dividend of 7½% in respect of the 10 months to April 30, 1948 (7½% for 12 months to June 30, 1947).

Davies & Metcalfe—Net profit, after all expenses, including taxation, for 1947, £16,731 (£14,562); dividend of 15% (11%).

Bruce Peebles & Company—Ordinary dividend of 5% and bonus of 5% (both same); participating dividend on preference shares of 2½%, making 10% (same).

Davis & Timmins—Net profit for 1947, after tax, £56,342 (£42,388); to pensions, £3,000 (same); stock contingency reserve, £25,000 (£10,000); final dividend of 20% and a bonus of 10%, making 40% (30%); forward, £79,439 (£78,734).

Tweedales & Smalley (1920)—Profit for the eight months to December 31, after taxation and depreciation, £114,202 (£87,628 for year); final dividend of 12½%, making 17½% for period (same); to contingencies reserve, £50,000 (£100,000); stock reserve, £15,000 (nil); forward, £77,930 (£72,040).

Padley & Venables—Trading profit for the year 1947, £53,556 (£26,380 for the nine months to December, 1946); to depreciation, £9,489 (£3,108 for nine months); directors' fees, £750 (£244); cost of conversion to public company, £757 (nil); net profit, £42,560 (£23,028 for nine months); to tax provision, £25,850 (£14,746); general reserve, £6,204 (nil); final dividend of 50%, making 100%; forward, £39,554 (£39,151).

Westinghouse Brake & Signal Company—Trading profit for the period to September 27, 1947, £302,774 (£250,413); E.P.T. overprovision, £36,500 (£166,000); depreciation, £65,153 (£59,989); income tax and profits tax, £118,211 (£147,000); net profit, £155,910 (£209,424); appropriated for increase in cost of completing a contract in progress, £20,000 (nil); general reserve, £50,000 (£100,000); pensions, £5,000 (£20,000); 14% dividend, £86,423 (same); forward, £93,680 (£99,193).

Yorkshire Copper Works—Trading profit for the seven months ended July 31, after making provision for depreciation, taxation and all other charges, £98,849; brought forward at January 1, 1947, £23,761; dividend at the rate of 7% per annum on the preference stock for the half-year ended June 30, 1947; dividend at the rate of 5% per annum on the second preference stock for the half-year; dividend of 11⅜% on the ordinary stock for the seven months ended July 31, 1947, £13,393; contingencies, pensions, etc., £5,000; to general reserve, £50,000; to stock reserve against possible fall in prices, £25,000; forward, £23,634.

New Companies

("Limited" is understood. Figures indicate capital. Names are of directors unless otherwise stated. Information compiled by Jordan & Sons, 116, Chancery Lane, London, W.C.2.)

Ralph Neal, 34, Station Road, Southgate, London, N.—Die casters and sinkers, etc. £2,000. W. J. Webber and J. E. Porter.

George Lines, 42, Station Road, West Drayton—Engineers, founders, etc. £5,000. A. G. and I. E. Lines, and L. J. Judson.

North Western Metal Products, 28, Brownsville Road, Heaton Moor, Stockport—£1,000. O. F. Christenson and R. S. Potter.

MacArtney & Company (Warrington), Church Street, Warrington—Engineers, machinists, etc. £10,000. W. and M. E. MacArtney.

Bowler & Sidney, 52, Lincoln's Inn Fields, London, W.C.2—Engineers, founders, etc. £10,000. H. P. Bowler and D. L. Sidney.

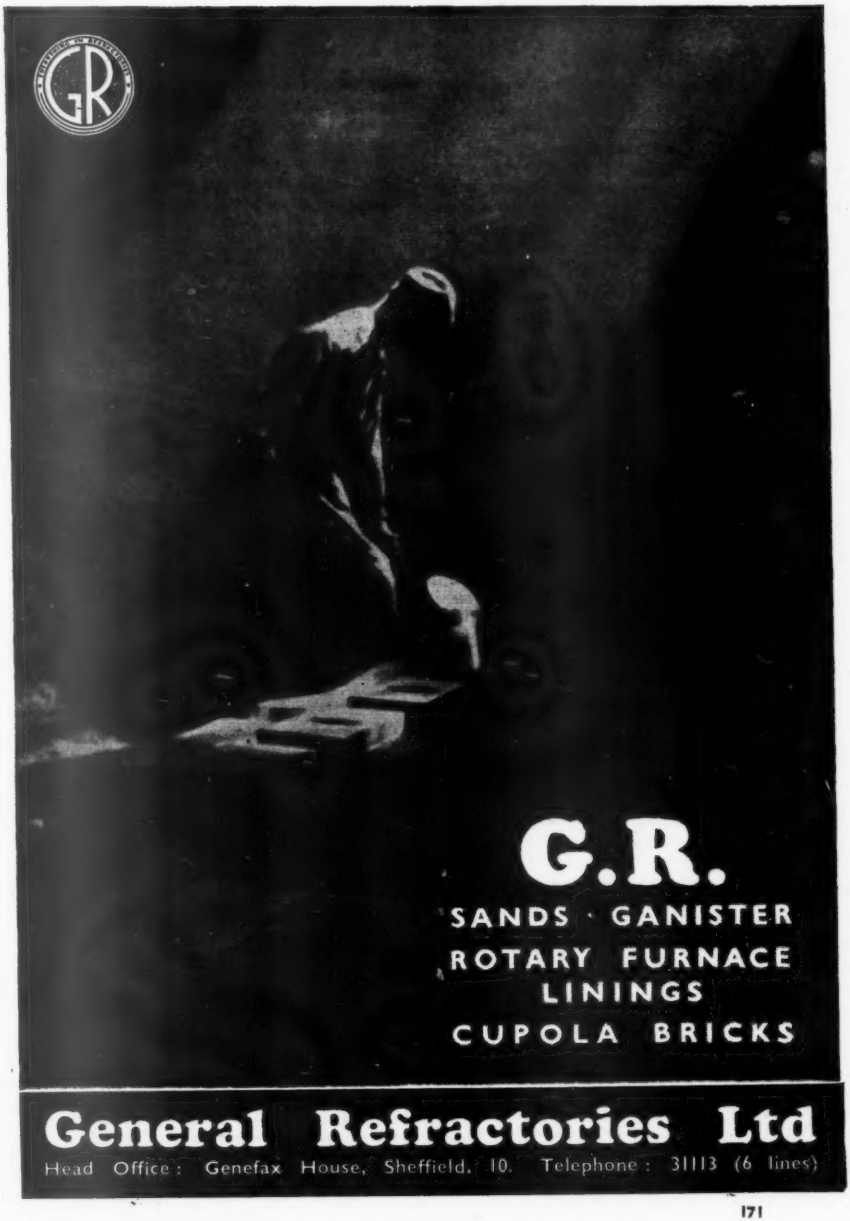
Mason & Caldicott, 645, Bristol Road South, Northfield, Birmingham—Engineers, toolmakers, etc. £3,000. S. Mason and G. F. M. Jenkins.

Dewhirst & Dilley, Roebuck Yard, Northgate, Halifax—Brassfounders and finishers, engineers, etc. £6,000. S. J. Dewhirst and E. S. Dilley.

G. H. Mason (Kendal), 54, High Street, Skipton—Manufacturers of fireplaces, grates and ranges, etc. £4,000. W. M. and G. A. Mason.

J. Darnley Taylor, 14, Devonshire Square, London, E.C.2—Manufacturers of cement-packing machines, etc. £5,000. J. D. and D. J. D. Taylor.

Engine Applications, 282, Bury New Road, Manchester—To acquire all or 90 per cent. of the issued share capital of H. E. Nunn & Company and Newage (Manchester), and to carry on business of engineers, etc. £150,000.


G.R.
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ROTARY FURNACE
LININGS
CUPOLA BRICKS
General Refractories Ltd
Head Office: Genefax House, Sheffield, 10. Telephone: 31113 (6 lines)

171

Raw Materials Markets

Iron and Steel

Imports of foreign ore are having to be maintained at an unusually high level in order to keep pace with the increased blast-furnace consumption. Supplies of coke are reasonably adequate and outputs of basic iron have been raised appreciably. Even so, the output of pig-iron is not in excess of consumption at the steel plants and, similarly, it is not yet possible to relieve the stringency at the foundries. The scarcity of high-phosphorus iron for the production of light castings has been of long duration; now, similar complaints of difficulties arising from the lack of other grades of iron are emanating from the heavy engineering and jobbing foundries. These users have an impressive volume of work in hand, but more iron is needed to maintain steady production.

Hopes of any early expansion of imports of steel semis have now been officially refuted; indeed, a further shrinkage during the next few months is indicated. This restriction is all the more unfortunate since British re-rollers have a substantial volume of export orders in hand, and the sheet mills seem to be unable to make any impression on their heavy commitments. It is obvious that re-rollers will have to rely almost exclusively on deliveries of home-produced material and the possibilities of expanding the output of billets, sheet bars, etc., are being actively explored.

The plate mills are turning out record tonnages and in the production of light plates valuable assistance is being given by the sheet mills. Nevertheless, demand far exceeds supply and in all the bartering with Continental and transatlantic countries an outstanding feature is the insistent demand for finished-steel products. Diversion of larger tonnages to the export markets is inevitable, despite the resulting restrictive influence on home industries. Even rolling stock and electrical equipment, desperately needed at home, are being allocated for export, and tube makers are also shipping large tonnages abroad. A fair amount of steel for Period II delivery has already been authorised, but the extent of the new allocations is still a well-kept secret.

Non-ferrous Metals

The British Non-ferrous Metals Federation has issued the United Kingdom figures of copper consumption for January, showing that in virgin metal there was a very sharp advance compared with December, which at about 27,000 tons was well below the average for 1947. Actually, the January total was 36,817 tons of virgin copper and the December figure 27,439 tons; in scrap the comparison was 13,984 tons for January and 18,111 tons for December. It is noticeable that while virgin metal increased there was a marked decline—over 4,000 tons—in scrap. In view of the fact that the Ministry of Supply has relatively little secondary metal now for sale outside the tonnage offered on tender, it is not perhaps very surprising that this decline has occurred, and it may well be that during 1948 there will be an even more marked reduction in the amount of scrap consumed. During 1947 the U.K. usage of copper and alloy scrap on the basis of copper content averaged nearly 16,000 tons monthly, so that January's figure was well down in comparison. If secondary copper is going to be scarce, consumers will be obliged to use virgin metal, providing it is obtainable, and these statistics for the first month of the year certainly suggest that this is what is happening. But there is a limit to the amount of copper that the Government can secure, for the dollar problem has still to be reckoned with. Last year, on a consumption figure of 350,000 tons of virgin copper, stocks in the country increased somewhat, but whether the Ministry can match this figure in 1948 may be doubted.

Unfortunately, there is a hold-up of Rhodesian copper at the shipping port of Beira, and it is reported that some 40,000 tons of blister copper are awaiting clearance. Strenuous efforts are being made to clear this "traffic block," but it is bound to be some months before this is achieved. Rhodesia has, of course, suffered for a long time from inadequate railway facilities, and in addition, at the present price of copper, there is every incentive to expand production to the highest possible level. Meanwhile, it appears that the Government will have to use every endeavour to procure copper from dollar areas, if the industry is to maintain last year's level of activity.

New Patents

The following list of Patent Specifications accepted has been taken from the "Official Journal (Patents)." Printed copies of the full Specifications are obtainable from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. each. The numbers given are those under which the Specifications will be printed, and all subsequent proceedings will be taken.

593,900 CAMPBELL, C. A. Cleaning metal parts and baths for use in connection therewith.

593,926 HENLEY'S TELEGRAPH WORKS COMPANY, LIMITED, W. T., JUDGE, E. E., and FRY, F. H. Presses for the extrusion of metal.

593,935 BATCHELLER, C. Method for producing designs on stainless steel.

593,956 URMENYI, L. Device for measuring the thickness of foil and sheet metal.

593,959 BELLAMY, H. T. Production of moulded metallic articles.

Value of Scientific Management

Speaking at a Press conference in London last week, Mr. I. A. R. Stedeford, chairman and managing director of Tube Investments, Limited, said that an improved supply of coal, steel, textiles, and other basic commodities would result if the principles of scientific management were applied throughout industry. As a result of introducing methods of scientific management to some of the firm's subsidiary companies, there had been overall increases in productivity. At one factory output had gone up by 64 per cent., with an increase in the total volume of output of 31 per cent.